

Improved Medical Care Statistics and the Health Services System

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THE NOTION that a physician suggest to a group of statisticians what they should do may seem strange, but it is not new. The precedent was set by the physician who founded the field of vital statistics, William Farr. However, Farr did not ask the first important question in vital statistics. When the English Government introduced the Registration Bill in 1839, it was proposed to record only the event of death. Edwin Chadwick, the lawyer who founded the public health movement, saw that this exercise was without redeeming social, scientific, or medical merit, and he insisted that the record also indicate the cause of death so that physicians could know how to direct efforts at improving the health of the people (1).

When it comes to medical care, however, statisticians, lawyers, and physicians have to acknowledge the perceptiveness, courage, and perseverance of a nurse. Florence Nightingale roundly condemned the hospital statistics available in her time and asserted that it was virtually impossible to deduce anything from them with respect to the relative merits of different hospitals. In general, the charge is still

true; for example, age-specific, case fatality rates by diagnosis are not available for United States hospitals. There are several other countries which do have such information now.

To overcome deficiencies of this kind, Florence Nightingale proposed a uniform reporting system for all London hospitals (2). She wrote to William Farr asking for a table of mortality of the various London hospitals for a sufficient number of years so that a general life table of the London hospitals could be calculated showing that each hospital had its own life risk. On another occasion she wrote with respect to the science of statistics that, "upon it depends the practical application of every other (science) and of every art; (it is) the one science essential to all political and social administration, all education, and organization based on experience, for it only gives exact results of our experience" (3).

Need for Medical Care Statistics

All that was said more than 100 years ago. Better objective information, that is statistics, about the effectiveness and efficiency with which medical care services are provided in response to specific health problems is indeed long overdue.

The health services system consumes, costs, or spends, depending on the point of view, over \$45 billion a year. Some \$600 million is spent on biomedical research, but only about \$20 mil-

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lion is spent on research and information designed to explore the workings of the health services system. I believe these relationships are inappropriate; a larger proportion of the health services budget should be allocated to objective study of its operations at all levels.

The health services system is one of society's great service systems, like transportation, communications, defense, innkeeping, and the church. All have objectives, some more clearly defined than others; all accept the need for accountability in terms of private satisfaction, or public records, or both. If the national pool of health personnel, facilities, knowledge, and finances is regarded as a major national resource to which society devotes about 6 percent of its annual gross national product, surely the consumers are entitled to know a good deal more than they do now about the extent to which the objectives of this system are achieved at the national, State, and local levels. The information on which the other great service systems base their decisions is without doubt substantially more sophisticated than that used by the health services industry. Where resources are scarce and the needs are great, it is essential to introduce improvements in the information available on which to base critical decisions.

In the field of health there are two broad areas—environmental health services and personal health services. Medical care here means personal health services, those things done to and for all persons who request or require health services provided by physicians, nurses, and dentists, and by allied health personnel. No distinction is made among preventive, diagnostic, therapeutic, and rehabilitative functions, and the physical, emotional, and social components of illness are not separated. These are transient divisions of interest, emphasis, organization, and style based more on tradition and arbitrary jurisdictional arrangements than on humanitarian, scientific, or technical constraints.

The various sites of care at which personal health services may be given, such as the solo practitioner's office, outpatient dispensary, clinics, and wards of voluntary, private, or public hospitals, health department clinic, group practice clinic, home, factory, or school, are not elements of the definition. Nor is the posture of the

patient—vertical or horizontal—a factor. Finally, the methods by which the patient's care is financed, whether it be from public, private, or voluntary sources, and the physician compensated, whether it be fee-for-service, capitation, sessional compensation, or annual salary, do not affect this definition.

I refer to statistics about personal health services as medical care statistics. More data about all of the personal health services sought and received and all of the associated benefits and risks are needed.

Points of View

There are basically three points of view from which personal health services can be examined. The first is the view of the individual patient and his particular problems, which is also the view of the clinician and the source of traditional diagnostic data. It is important that persons in health services remember that their work is to help individual patients with their problems. After all, statistics, as I think Bradford Hill used to say, are really people with the tears wiped off.

The second point of view is that of persons responsible for an institution, agency, practice, or program. Their concern is to understand the experience of a particular segment of the population using a particular segment of the health services system. The essential deficiency in statistics derived from the experiences of individual institutions such as hospitals, physician's practices, voluntary agencies, or even prepayment insurance plans and categorical programs is that adequate information about the population at risk or the denominator is customarily unavailable. Nothing is known about all the experiences of those who are not represented in the denominator. This defect may be compensated to varying degrees, but rarely can it be overcome completely.

The third point of view is that of the community or the defined population where it is possible to relate medical care statistics to a population defined by geographic or political boundaries. It is only with such a base that the ecology of medical care can be thoroughly understood. The relationship between health services and resources and medical care needs and

demands interests both patients and potential patients. Who gets what, for which purposes, and with what results are the central questions.

From the point of view of the health officer or the health services administrator, who is responsible for the health of all the people in his jurisdiction, information about the availability, accessibility, effectiveness, and efficiency of all personal health services is essential. Not only is such information essential to the health department and other institutions and agencies for administrative purposes, but it is a prerequisite for effective planning and policymaking. The Comprehensive Health Planning and Public Health Services Amendments of 1966, Public Law 89-749, provide for "the establishment of a single State agency as the sole agency for administering or supervising the administration of the State's health planning functions under the plan"; and "for the establishment of a State health planning council, which shall include representatives of State and local agencies and nongovernmental organizations and groups concerned with health, and of consumers of health services, to advise such State agency in carrying out its functions under the plan" (4). It does not say that this agency has to be a health department.

Who is to provide the data on which this group of citizens will make their decisions? Undoubtedly, the new health planning councils will be composed largely of community leaders who are accustomed to basing their decisions more on facts than on individual experiences, colorful assertions, or authoritarian pronouncements.

If the statistical arms of health departments do not do the work Florence Nightingale urged on them more than 100 years ago, some other agency will do it. The possibilities include insurance carriers, fiscal intermediaries, hospital planning councils, areawide planning councils, medical schools, regional medical programs, voluntary agencies, welfare departments, and medical societies. Each of these groups could measure certain aspects of the input and output of the health services system.

At present, none of them has the same broad social mandate as the health department. The Public Health Service, through the National Center for Health Statistics, has established a

model. If the State and local health departments do not live up to their mandates, it seems clear from the Comprehensive Health Planning and Public Health Services Amendments of 1966 that other agencies will be established to gather statistics on personal health services. In some places, this will undoubtedly occur. If a clearer legal mandate is required, a national commission could be appointed to examine the matter and recommend necessary legislation.

I propose that the terms "vital statistics" and "public health statistics" be abandoned, and that every health department establish a new unit, bureau, division, department, or center for health statistics with a mandate much broader than that connoted by traditional titles. Such a unit would be responsible for collection and analysis of all statistics relating to the health, health problems, and health services of the community it serves. Funds should be made available by Federal formula and project grants to strengthen these new expanded units. Consultation should be sought and made available from stronger agencies and institutions, such as the National Center for Health Statistics.

I suggest also that each health statistics unit establish a continuing relationship with an appropriate university department in its region. Faculty members of departments of biostatistics, epidemiology, community medicine, or hospital administration could be consultants or members of advisory committees for the unit. Members of the unit, in turn, could be given university faculty appointments and encouraged to present their problems to students and faculty colleagues. There are ample precedents for these kinds of interlocking arrangements.

Levels of Evaluation

With this extended mandate, responsibilities for registration and vital statistics would be only a small fraction of the work of the unit. There are at least five basic levels to be considered in evaluating the health services system—death, disease, disability, discomfort, and dissatisfaction.

Death. At Chadwick's insistence, the statisticians of the day moved from recording the event of death to recording the cause of death. We have made some progress since then, but the inclusion of additional information is desir-

able from the point of view of medical care. For instance, it would be important to know not only how long the physician signing the death certificate attended the deceased but also how long the deceased had been receiving medical care for the immediate cause of death.

It would also be desirable to know the relationship between the diagnosis at admission and the immediate cause of death. Analyses of these associations would provide insights into the relationships between preterminal medical care and suspected, underlying, and immediately lethal disease. These may be three quite different diagnoses, and I believe we need to know much more about each in relation to both the medical care which is available and that which is used. In fact, I would go so far as to suggest that the concept of underlying cause of death may be obsolete. At a time when 75 percent of deaths occur in persons over age 50, is it realistic to base mortality statistics on often arbitrarily selected underlying causes when in older persons a number of contributory and potentially fatal conditions are usually present?

Disease. About 45 percent of the problems initially presented to primary-care physicians cannot be given a diagnosis which fits the rubrics of the International Classification of Diseases, except in the broadest categories (5, 6). What is needed is a classification of complaints, problems, conditions, and symptoms developed on the basis of their relative frequency and specificity in the general population. Patients present to primary-care physicians vague complaints, symptoms, and problems, not labeled diseases. For purposes of deploying health personnel, assigning tasks, and organizing services, we need to know how many people in a community have symptoms of sufficient severity to warrant their seeking or contemplating medical care.

This kind of classification can only be developed with the help of practicing physicians. It is not impossible to do; the precedent was set when the British Registrar General collaborated with the College of General Practitioners in a study of 171 practices (?). This study yielded the largest body of published data on primary medical care available anywhere. Similar studies are needed urgently in this country; pilot studies have been undertaken in Utah to develop

methods for morbidity reporting in physicians' offices. Some continuous recording of morbidity in general practice has been done in Vermont and more extensive studies are planned (8). Both the need and opportunity for collaborative research among practicing physicians, health statistics units, and universities have never been greater than they are today.

Just as important as a classification for presenting symptoms and complaints is a classification for the action taken by the physician. It is important to know not only what the patient complained of but what the doctor did about it. Such a classification might include "return when necessary," "return at a specific time," "diagnostic tests ordered," "referral for consultation," "referral for treatment," "hospitalization as emergency," "hospitalization for investigation," "hospitalization for chronic care," and "no further care needed."

This information is important in order to make better estimates of potential demands for medical care, educate and prepare physicians and other health personnel to meet these demands, and organize personnel and facilities so that the demands can be met.

Disability. The objective of health services is at least to keep people out of hospitals and, hopefully, to maintain functional capacity, productivity, and well-being. We have estimates of disability for the whole country from the National Health Survey, but little is available at State and local levels. We need estimates by census tracts and communities. We need to know much more about absenteeism from work, school, and usual activities, both in relation to functional severity and symptom-condition complexes and in relation to medical care sought and contemplated. Again, the need is to relate the functional impairment with some kind of actual or potential medical care to estimate the relation between need, demand, and available resources for medical care—particularly for rehabilitation services and home care programs. Sickness, disability, and morbidity surveys alone are not enough. We need to know more about what is done for specific problems, and, at a later stage, with what results.

Discomfort. Discomfort is a less severe form of disability, but is in some ways more important, particularly if we are interested in early

detection and prevention of illness. Little is known about the distribution of various symptom-condition complexes in terms of the amount of discomfort they produce. People have to perceive some disturbance in their health, interpret it as warranting medical attention, know that medical care is available, and be able to pay for it before they are apt to seek it. Much more information is required about this end of the spectrum of medical care in order to develop better ways of delivering health services to those who need and can benefit from them.

Dissatisfaction. Most of the implied criticisms of the present health services system in this country are based on articles in the popular press, medical horror stories, and economic analyses of the rising costs of health services. We need objective data on the organization of health services as seen from the viewpoints of all the consumers, not just those who complain. To what extent do persons want and have a personal physician to whom they can bring general complaints at any reasonable hour, or even at any unreasonable hour, of the day or night? Are the desired services accessible and available? Are they satisfactory? Would the services of a nurse be just as acceptable as those of a physician for particular problems? To what extent do people use multiple sources of care? To what extent do they travel out of their communities for medical care? Again, where do they go and for what reasons?

Sources of Data

There are four major sources of data—discharges, doctors, dispensaries, and domiciles. For each of the five levels of evaluating the health services system, there are a series of questions to which there are no readily available answers at present, largely because no one is asking the questions.

Discharges. We are now going to get data from a national sample of hospital discharges in the United States, 100 years after Florence Nightingale called for them in England. We still will not be able to compare State, local, or individual hospital performances. We need to know the relationships between the diagnosis or chief complaint at admission and the diagnosis at discharge. We need to know the functional

capacity of the patient on discharge; not just whether he is alive or dead. We need to know whether the final discharge diagnosis explained the chief complaint or admitting diagnosis. We need to know whether any disease, drug reaction, infection, or injury was acquired during hospitalization. We need to know whether the admission was primarily for emergency, acute, chronic, elective, social, or custodial care, or for investigation. We need to start calling services by their functional medical care objectives rather than by rubrics designed to justify third-party insurance payments.

Doctors. Physicians themselves are critical participants in the provision of much of the information we require for understanding the health services system. There is a great need for medical students to receive adequate preparation for their roles in the provision of health statistics. The work of the health statistician will be restricted until physicians recognize the importance of the information they generate. They should be encouraged to cooperate on the basis of commitment and enlightened self-interest, both individually and through formal organizations such as the American Medical Association, American College of Physicians, and American Academy of General Practice.

The health statistics unit and the universities, particularly the medical schools, have the opportunity to collaborate in improving teaching about health statistics. I am convinced that this subject can be made relevant and exciting to medical students.

The appeal to physicians can be made on the basis of their individual and collective responsibility for leadership and their potential contribution to understanding the medical care process and improving the health services system. Once physicians appreciate that they are participating in the development of their own profession and are contributing to the improvement of their own work rather than being the objects of rascal hunts on the part of government authorities, there is likely to be substantial progress.

Another area of needed study is the analysis of the physician's job. We know very little about the way physicians actually spend their time. What proportion of time is spent listening and talking to patients, giving treatments, prescrib-

ing, recording information, and in activities which might be handled more efficiently by nurses or allied health personnel or could even be automated? Similarly, we know little or nothing about what nurses do.

Dispensaries. The care of vertical patients constitutes the great bulk of all medical care. Whether these patients are seen in outpatient clinics, health department clinics, group practices, physicians' offices, or elsewhere, we need to know much more about the distribution, availability, accessibility, and utilization of ambulatory services. If access to physicians' offices and effective participation in the collection of data are not always possible in every community, studies can be initiated in outpatient and health department clinics. Traditional outpatient statistics only count visits; this is like counting deaths in Chadwick's day, revealing little about the nature or purpose of the work done. Cohort studies using record linkage could be used to examine the natural history and progression of the diagnostic process from initial complaint or symptom to final established diagnosis. This can all be related to the services needed, demanded, and utilized.

Data of these kinds are not available for three major health problems, heart disease, cancer, and stroke, that are the basis for the Regional Medical Programs. I believe that if this kind of information had been available, the futility of attempting to regionalize health services on the basis of categorical diseases would have been apparent sooner. At present, many medical schools are trying to plan Regional Medical Programs without data, experience, or even familiarity with the literature on regionalization in other parts of the world. Commercial systems analysts are advising some schools, but apparently they too are unfamiliar with medical care statistics. Medical care services have to be planned on the basis of the prevalence of symptoms and complaints, not discharge diagnoses or deaths. Symptoms and complaints are the input to the health services system; discharge diagnoses or deaths, the output. Regional Medical Programs could benefit greatly from assistance in developing data on health resources, services, and needs from the vantage point of health statistics units in health departments.

Domiciles. The household interview and

health examination are the foundations of the pyramid of information about the health services system. The National Health Survey has developed sophisticated methods which can readily be replicated at State and local levels. Yet I am continually impressed in discussions about planning new health services for people in communities by the almost complete lack of useful information which health departments can produce about the way in which people seek and use health services in relation to their perceived and actual needs. In the final analysis, the health services system is no different from the other service systems—the customers probably have the last word. I believe we need to know more about their concerns and interests.

There is need to come to some agreement about terminology. Uniform definitions with respect to institutions, units of service and activity, personnel functions, complaints, symptoms, and diseases are desirable. Data collected by all Federal and State agencies should, at least, be compatible, if not comparable. Fortunately, computers insist on forms of cooperation not readily attainable by mere mortals. The World Health Organization has examined these problems in some depth; much more work needs to be done in the United States to standardize terminology and reporting procedures (9-11). Methods of recordkeeping in physicians' offices and of handling utilization data need to be improved. Here again there are precedents and experience on which to build (12, 13).

Simple precoded, mark-sense forms or more sophisticated input consoles in physicians' offices with direct inputs to on-line centralized computers could be used in ways which would preserve confidentiality for both physicians and patients. The data generated would provide physicians with information about their own practices, as well as information of fundamental importance to an understanding of the health services system.

Further applications of computer technology are to be found in record linkage studies. H. B. Newcombe of Atomic Energy of Canada and others have suggested methods for family linkage of vital and health records (15). However, there has been only one study of record linkage applied to a health services system serving a defined population. This was recently completed

by the Oxford Regional Hospital Board in England and shows the kinds of data which can be obtained on the flow of patients through the hospital system of a region (16). This unique study could be replicated in one or more States in the United States. Such information would be invaluable for Planning Regional Medical Programs.

The problem of estimating denominators will probably persist for a long time in the United States. The obstacles are formidable but not insoluble. Approaches to the measurement of the catchment areas served by hospitals and other health institutions have been developed for use where the population at risk is not known, but more work is needed (17-19). The household survey is, of course, especially useful in this regard because it can be used to produce denominator data.

Finally, there is the matter of collaboration with other groups. The health statistics unit should be in an unusually strong position to propose active collaboration for purposes of data gathering with medical societies, hospitals, nursing homes, welfare departments, insurance carriers, planning councils, and other groups responsible for providing or financing health services. One great virtue of the National Center for Health Statistics lies in the fact that it only collects and analyzes information; it assumes the posture of an objective source of data which all can respect and use. It is not responsible for any medical care service program. This is in contrast to the Social Security Administration, for example, where present arrangements call for it to analyze information on charges and utilization as a basis for its decisions, regulations, and bargaining position. However objective its efforts and methods may be, its motives are bound to be suspect. The same charges are quite untenable when health statistics are collected by an independent unit analogous to the National Center for Health Statistics (20).

Health statistics units should be in a sound position to obtain the support of medical schools, hospitals, physicians, medical societies, and others responsible for the organization of the health services system in gathering data which will enable these institutions and individual persons to do their best. Physicians and health institutions want to do the best jobs pos-

sible, and the gathering of health statistics should proceed on that assumption until there is evidence to the contrary.

Summary

I have tried to challenge the vital statisticians of the country to revitalize their profession by taking on the task of developing a broad range of medical care statistics which will help us to understand better the health services system of the country. The object is to use the health personnel and resources more effectively and efficiently in the interests of the health needs of society.

I propose that State and local vital statistics units be expanded to health statistics units. These should be supported by Federal formula and project grants as well as by State and local funds. If this expansion of activities is not accomplished, these functions will be taken over by other institutions and agencies and the health department bypassed.

Statistics units should prepare actively to provide the health services statistics which will be required by health policy planning councils and by health services administrators. A national and local mechanism for developing common definitions to ensure compatibility and encourage national and international comparability should be established.

Statisticians should experiment with record-linkage studies to understand more thoroughly the health services system in a region. They should also consider the experiences of other countries, as well as of different places in this country, with particular emphasis on newer methods of recording, processing, storing, analyzing, and retrieving data at all levels of the system.

Finally, statisticians should institute regular systems for reporting data from all levels of the health services system, including hospital discharges, ambulatory clinics, and physicians' offices, as well as from household interviews and examinations. It is necessary to relate the patient's complaint, the site, nature, and outcome of the service, and the physician's diagnosis.

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Influenza Vaccines for 1967-68

The Public Health Service Advisory Committee on Immunization Practices warns that substantial numbers of cases of type A2 influenza may be expected during the 1967-68 season, especially in eastern parts of the country. No significant amount of type B infection is likely this year because most areas of the United States experienced it in 1965-66 or 1966-67. Type A outbreaks usually occur every 2-3 years and type B, every 3-6 years.

Two influenza vaccines are available for the 1967-68 season. A newly introduced bivalent vaccine contains only the A2 and B strains currently prevalent. A polyvalent vaccine, similar to that used in past years, incorporates the older A and A1 strains as well as the newer A2 and B strains.

Immunization with bivalent vaccine is recommended for persons over age 45, especially those over age 65, persons with chronic illnesses, and institutionalized patients.

Immunization should begin as soon as practicable after October 1 and ideally should be completed by early December. Persons who require immunization and have not been vaccinated since 1963 should receive a primary immunization series of bivalent vaccine, consisting of an initial subcutaneous dose, followed by a second dose 2 months later. Persons who have been immunized subsequent to July 1963 need only a single booster of bivalent vaccine.